

2006

A solution for girls in the math and science achievement gap? : a look into the role of single-sex classrooms in public schools : what do they really promote and why they will under serve our girls in the future

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in the Math and
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Achievement Gap?

A Look into the
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January 2007

A Solution for Girls in the Math and Science Achievement Gap?
A Look into the Role of Single-Sex Classrooms in Public Schools: What Do They Really Promote and
Why They Will Under Serve Our Girls In The Future

By

Jennifer E. Fleming

A Thesis
Presented to the Graduate and Research Committee
of Lehigh University
in Candidacy for the Degree of
Master of Arts

In
American Studies

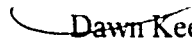
Lehigh University

8 December 2006

This thesis is accepted and approved in partial fulfillment of the requirements
for the Master of Arts.

12/5/06

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Abstract

On October 24, 2006, President Bush signed into law legislation which provides funding for public schools interested in pursuing single-sex classrooms within a larger co-educational context. This marked the most recent step in single-sex classrooms as a solution to the ailments of America's public schools. This thesis explores single-sex classrooms as an educational option in detail while examining its shortcomings with respect to the qualitative and quantitative studies which suggest that public schools shortchange girls. In short, girls have been found to be victims of pervasive stereotyping, biased curriculum, and harassment which affect their choices of higher level math and science classes. Data on single-sex classrooms' potential as a solution for the achievement gap between girls and boys is currently inconclusive, and single-sex classrooms do not address the main issues that effect school children's ability to perform. Through changing present co-educational classrooms, public schools will do a greater service to school children rather than segregating them by sex.

A Solution for Girls in the Math and Science Achievement Gap?
A Look into the Role of Single-Sex Classrooms in Public Schools: What Do They Really Promote
and Why They Will Under Serve Our Girls In The Future

The State of Our Public Education: Introduction

President George W. Bush stated “We have a great national opportunity-to ensure that every child, in every school is challenged by high standards... to build a culture of achievement that matches the optimism and aspirations of our country.”¹ The American Public school system does, indeed, provide a great opportunity for all who live in our country. Its foundation is intimately linked to the country’s own roots and Thomas Jefferson observed that school boards gave ordinary citizens practice in democracy, as its highly decentralized structure allowed citizens all over the country to voice concern and individual opinions to create a change.² Collective action to improve oneself as well as one’s community is only one of many core values that public schools promote. A balance of individual success as well as collective good is essential to what many believe is the American Dream. The access and responsibility to make progress toward success for all in American society is the dream that many believe is a core value that makes America stand out among countries. After decades of schools divided by genders, races, and religion, the best way to commonly educate children was found to rest in the policy of inclusion in public schools. Although there

¹ Jennifer Hochschild and Nathan Scovronick. *The American Dream and the Public Schools* (New York: Oxford University Press, 2003), 1.

² David Tyack. *Seeking Common Ground: Public Schools in a Diverse Society* (Cambridge, Mass: Harvard University Press, 2003), 5.

was evidence of neglect in the education of some public school children, in the later half of the twentieth century, progress has been made in many areas. Dropout rates are falling, scores on standardized tests have risen and college attendance is at an unprecedented high.³ These statistics, however, only tell part of the story.

American public schools are not fulfilling the American Dream for a large portion of the population. Minority children are crammed into inner city schools where resources are scarce, there are not enough desks, and buildings are falling down. In some school districts, a de facto segregation of races is occurring where white school children with means are fleeing the inner cities leaving only poor minority children in disastrous school conditions. Sociological studies have shown that, in fact, the deep belief held by many in the American dream and belief in meritocracy as “an accurate explanation of our social system” is providing an excuse for stagnation in the movement for change.⁴ The belief that the individual is solely responsible for their successes and failures is signaling a lack of balance of the core values, neglecting the societal responsibility to work together for the good of the whole. This imbalance is leaving many school children behind and leading many parents to search for solutions.

Although the discrepancies between races is a grave problem that America must face, the focus of this paper will be the discrepancies between the genders that is also contributing to an imbalance in society’s struggle for a more level playing field. Sociologists have focused on the many ways in which girls experience public school

³ Hochschild and Scovronick. *The American Dream and the Public Schools*, 3.

⁴ Heather Beth Johnson, *The American Dream and the Power of Wealth: Choosing Schools and Inheriting Inequality in the Land of Opportunity* (New York: Routledge, 2006), 23.

differently than boys. In a groundbreaking study, the American Association of University Women (AAUW) sponsored a large nationwide survey for girls in grades K-12 in which they asked girls an extensive list of questions on their personal experiences in public school.⁵ The study had wide and shocking results which drew people's attention to the plight of girls in the decades after the Civil Rights Bill and Title IX. Although studies support that race may be a larger factor in the discrepancies in achievement, there are gaps within races which show that girls generally lag behind boys of their own racial category on tests in math and science. This gap is the largest for Latinos, and smallest for African-Americans, but also significant for white students, even of an upper class socioeconomic background.⁶ It seemed that classrooms were not the egalitarian place that they had appeared.

The AAUW Report: How Schools Shortchange Girls

In the AAUW report from 1992 and the follow-up *Gender Gaps: Where Schools Still Fail Our Children* the results show the most glaring academic gap in the areas of math and science. Girls seemed to keep pace with the boys until late elementary school, around early puberty, where they experienced a sharp decline in grades and belief in their abilities. A goal of the 1992 AAUW study was "girls must be educated and encouraged to understand that mathematics and the sciences are important and relevant to their lives."⁷ The survey found that pervasive stereotyping

⁵ American Association of University Women. *How Schools Shortchange Girls* (New York: Marlowe and Company, 1992).

⁶ Sophia Catsambis, "The Path to Math: Gender and Racial-Ethnic Differences in Mathematics Participation from Middle-School to High School," *Sociology of Education* 67 (July 1994): 199-215.

⁷ American Association of University Women. *Gender Gaps: Where School Still Fail Our Children* (New York: Marlowe and Company, 1999), 12.

was one of the main culprits for the discrepancy between the number of boys and girls in math and science classes, and led to a larger problem of a lack of college female math and science majors. As of 1998, however, it is not the number of girls that are enrolled in math courses that seems to be lacking and this has been one of the most measurable improvements since the AAUW original study.⁸ The types of courses, however, that girls take differ from boys and this seems to be caused by pervasive stereotyping. Girls are still outnumbering boys in lower level mathematics and subjects such as algebra I and geometry, while boys are taking on computer science and calculus in much larger numbers.⁹ Different course selections seem to occur in sciences as well. Although the overall gap in numbers is closing, girls are more likely to take biology and chemistry, while boys dominate physics.¹⁰ Progress is being made in terms of opening up the possibility for girls to enroll in higher level classes; however, it seems stereotyping is still playing a part in the decisions of girls.

In *Gender Gaps*, the AAUW expands the survey from measurable quantitative aspects of gender to what happens in the workings of classrooms to ensure that a gender gap persists. The findings show that “subtle forms of classroom bias still discourage the achievement of girls and minorities, particularly in mathematics, science, and technology.”¹¹ In math and science classes, girls received far less teacher time and attention than the male counterparts in class. Due to the

⁸ Susan F. Chipman. “Research on the Women and Mathematics Issue,” *Gender Differences in Mathematics*, ed. Ann Gallagher and James C. Kaufman (Cambridge, UK: Cambridge University Press, 2005), 1-25; AAUW, *Gender Gaps*, 12-17.

⁹ AAUW, *Gender Gaps*, 13.

¹⁰ *Ibid.*, 15.

¹¹ *Ibid.*, 61.

unconscious acceptance of boys' "acting out," creating a disturbance in class, teachers are more likely to treat that disturbance with attention. Girls are stereotypically encouraged to sit quietly and therefore receive less attention, either positive or negative from the instructor. Less attention translates into less interaction and less feedback which places girls farther behind, and contributes to feelings of ambivalence in their abilities. This type of "gender reinforcement" that teachers unconsciously relay to their students both male and female is present in both single-sex and coed classrooms.¹² It can include the reinforcement of gender behavior in the classroom, as well as the belief that girls will have their "feelings hurt" if teachers discourage them. All kinds of gender reinforcements use stereotypes to limit girls' experiences with challenge and criticism and therefore limit their educational opportunities as a whole.¹³

Methods of teaching were also found in *Gender Gaps* to be an area for improvement where girls are subtly encouraged to not participate in upper level math and science. The lack of emphasis on female role models in each of the areas of math and science was found to have an influence on the choices that girls made in their courses.¹⁴ Innovative teaching strategies are also cited as necessary to achieve equality in educational outcome. Michelle Fine, among others, has advocated a use of cultural strengths to encourage students of different genders and backgrounds to challenge themselves to achieve in the classrooms. Through engaging in a practice of

¹²Valerie E. Lee, et al., "Sexism in Single-Sex and Coeducational Independent Secondary School Classrooms," *Sociology of Education* 67, no. 2 (1994): 92-120.

¹³Dianne D. Horgan, *Achieving Gender Equity: Strategies for the Classroom* (n.p.: Allyn & Bacon, 1995).

¹⁴AAUW, *Gender Gaps*, 69.

“color-blindness” or “gender-blindness” teachers may, in effect, be reinforcing the dominate white male values of competitiveness and fierce independence leaving children of backgrounds or families who encourage interdependence one step behind.¹⁵ Through a multitude of pedagogical techniques, each student can have the opportunity to experience all styles of learning and many opportunities to excel. New pedagogical techniques which address the problem of equity in the classroom, however, are not taught in many schools of education, contributing to the problem.¹⁶

The AAUW survey and its companion extend from the classrooms and data, into the world of teens. Citing observances and self-report data, the AAUW has found that not only are the actions in the classroom having an effect on the gender gap of girls and boys but the social world of young teens is contributing to learning as well. The study confirmed that girls are much more likely to drop out of school in high school than are boys. This is particularly true of minority girls, with the exception of the African-American community where girls have a slightly higher retention rate than their male counterparts.¹⁷ Researchers mostly found that in terms of dropping out, social class is the finest predictor of who drops out, although the fluctuations within racial and socioeconomic groups between males and females are prominent as well.¹⁸ The effects of this are obvious: the fewer girls in school, the fewer girls to even the gender gap between themselves and the boys.

¹⁵Michelle Fine, et al., “Communities of Difference,” *Harvard Educational Review* 67, no. 2 (1997), 274-284.

¹⁶AAUW, *Gender Gaps*, 73.

¹⁷ Ibid., 80-84.

¹⁸ Michelle Fine, *Framing Dropouts: Notes on the Politics of an Urban Public High School* (Albany: State University of New York Press, 1991), 21-22.

Sexual Harassment also contributes to pervasive stereotypes which keep girls out of typically “male domains.” A related AAUW survey entitled *Hostile Hallways* examined this phenomenon and found that girls were more likely to be targets of sexual harassment in their schools on a regular basis.¹⁹ Teachers and administrators were found to do little or nothing about this problem, and in fact, in a U.S. Supreme Court ruling in June 1998 effectively dismissed school district responsibility for sexual harassment unless it was specifically reported to an administrator.²⁰

Sociologists have witnessed the effects of daily sexual harassment and this will be discussed in further details in the following pages, but there is little doubt that it contributes to the inability of both girls and boys to move beyond stereotypes.

The AAUW studies have placed a spotlight on girls’ experiences in public schools and have provided important recommendations for schools to improve equal educational outcome. Advancements in the number of girls participating in subjects before deemed inappropriate for women are occurring and closing the gap quantitatively, but the root of the gender gap in math and science, stereotyping, is persistent and pervasive. In order better understand the dynamics of public schools and to find solutions, a group of sociologists and educators have looked more closely into the lives of school girls in America.

Confirming Silence: Notable Qualitative Contributions

Peggy Orenstein, Michelle Fine, and Carol Gilligan, and others, have focused on the daily lives of early adolescent girls through qualitative studies of public high

¹⁹ American Association of University Women. *Hostile Hallways: The AAUW Survey on Sexual Harassment in America's Schools* (New York: Foundation, 1993), 7.

²⁰ AAUW, *Gender Gaps*, 85.

schools. Their studies have focused on the daily lives of girls in public co-educational schools and reaffirmed many of the problems that the AAUW study brought to light. Orenstein, Fine, and Gilligan and Brown spent time with girls in public schools in similar formats: documenting the daily lives of girls by submerging themselves in the routines and gaining a year or more of personal interviews with girls, their families, and teachers.

These interviews confirm much of what the AAUW study found, but they also show another disturbing trend. Young girls (ages 7-11) in their interviews showed “clear evidence of strength, courage, and a healthy resistance to losing voice and relationship, even in the face of difficulties.”²¹ As they reach puberty (usually around ages 12-14), these same girls experience a sharp drop in this ability to voice their opinions and feelings strongly and clearly. In fact, despite changing societal expectations, girls at the ages of 12-14 experience “traditional patterns of low self-image, self-doubt, and self-censorship” and this pattern of general low self-esteem is much greater than any drop demonstrated in the male population of the same age, and girls never seem to fully recover.²² This drop in feelings of self-worth affects many aspects of teen girls’ lives, but for the purposes of this paper, it is particularly noteworthy that during this drop in self-esteem, a seemingly related drop in their interest in math and science also occurs. By the age of 15, only half as many girls as boys in the same math and science classes are likely to feel themselves competent. In

²¹ Lyn Mikel Brown and Carol Gilligan. *Meeting at the Crossroads: Women’s Psychology and Girls’ Development* (Cambridge, Mass: Harvard University Press, 1992), 4-5.

²² Peggy Orenstein. *Schoolgirls: Young Women, Self-Esteem, and the Confidence Gap* (New York: Anchor Books, 1994), xx.

fact, studies have shown that a loss of confidence “in math usually precedes a drop in achievement”; this parallel margin is termed the “confidence gap.”²³ It is important to emphasize that this drop in self-esteem and difficulty using their voices is not simply found in co-educational environments. In a study compiled by Carol Gilligan, Nona Lyons and Trudy Hanmer, girls in the Emma Willard School, an all girls academy, related to one another in complex ways that were in some ways different from their co-educated counterparts, but exhibited the same self-esteem drop and perceived loss of voice in the classroom suggesting that single-sex schooling alone will not solve this particular problem.²⁴

There are many theories as to why this occurs, from lack of teacher attention, to gender stereotyping in the classroom or the hallways, peer pressure to conform to “traditional gender roles,” or the “fundamental paradox” that Brown and Gilligan refer to as a “central organizing feature of women’s development” which causes women to silence themselves, or their challenges to traditional female roles, due to the fear that they may “risk relationships to conflict.”²⁵ It could very well be a combination of all of these factors, and the factors in the AAUW study, mentioned above. Nevertheless, it seems from the extensive studies done into the lives of pre-pubescent to pubescent girls there is a persistent and troublesome trend that suggests not ability, but social forces are causing girls to lose interest and confidence in math and science.

²³ Ibid., xxi.

²⁴ Nona P. Lyons. “Listening to Voices We Have Not Heard,” *Making Connections: The Relational Worlds of Adolescent Girls at Emma Willard School*, ed. Carol Gilligan et al. (Troy, New York: 1989), 30-72.

²⁵ Brown and Gilligan, *Meeting at the Crossroads*, 3.

Seeing through the Fog: How Do We Solve the Achievement Gap?

Solving the problem of the achievement gap in math and science for girls and boys has been a subject of much disagreement and no “policies in civic education have perhaps been more sharply contested.”²⁶ Although, the achievement gap in math and science has without a doubt narrowed since the 1970s and the implementation of Title IX, and has narrowed even further since the initial 1992 study by the AAUW, the gap between girls and boys’ willingness to participate in higher levels of math and science and their self-reported confidence in the subjects still shows a discrepancy which seems to be disadvantaging girls across the country. The nature of the problem, however, has been elusive. Close studies into the qualitative aspects of the gender gap has shown that male and females only show consistent discrepancy in standardized tests. Most of the data that has been gathered has been in the areas of SAT math, or ACT math, but it shows backward projection to the standardized tests of students in late elementary to middle school. The data of standardized test analysis does not reflect the same result as data that is gathered in the classrooms. In most cases, it seems that girls are the classroom achievers in terms of grades in both high level math and verbal classes.²⁷ The problem of the discrepancies in the standardized tests occurs, however, when it becomes extrapolated over a student’s life. For instance, since SAT scores are a main factor in college admissions, girls are being excluded from better colleges and technology focused colleges much more than men due to their inability to perform on math standardized

²⁶ David Tyack, *Seeking Common Ground*, 37.

²⁷ Alexander W. Astin, *What Matters in College? Four Critical Years Revisited* (San Francisco: Jossey-Bass, 1993), 165-186.

tests. It is not clear why this discrepancy occurs and is possibly a large combination of factors, although some of the possibilities for this will be discussed later in the paper.²⁸ Many solutions have been proposed from more cooperative learning projects in math and science, that some believe favors girls' ability to learn (I will visit this later in the paper) to longer school days and specialized math and science high schools, which begin channeling students before the drop in female self-esteem occurs.

The most recent solution proposed to solve the achievement gap, as well as other education problems that persist in public schools, is single-sex classrooms within a co-educational setting. With the passage of No Child Left Behind by George W. Bush in 2001, schools have began experimenting with new and different types of schooling in order to meet the rigorous standardized testing requirements and to maintain or increase their federal funding. Within No Child Left Behind, there is a provision for federal money to be provided to schools pursuing single-sex classrooms or single-sex public schools.²⁹ This clause was then expanded to include a legislative measure signed by President Bush on October 24th to bring single-sex classrooms in alignment with Title IX of the Education Amendment Acts of 1972. Just five years before this paper, there were only a few public schools in the country pursuing the single-sex option as a way to boost achievement. Most of these first schools were in urban settings, aiming to solve not only the boy/girl achievement gap in math and

²⁸ James P. Byrnes. "Gender Differences in Math: Cognitive Processes in an Expanded Framework." *Gender Differences in Mathematics*, 79-83.

²⁹ National Association for Single Sex Public Education website: www.singlesexschools.org. Accessed 10/16/2006.

science, but the racial gaps between black male and black female achievement and between black male and white male achievement. Since five years ago, this movement has expanded beyond the urban setting and into suburban school districts as they aim to boost scores for both male and female students. As of September 2006 there are 241 public schools throughout the country which provide some single-sex educational option, with 190 offering single-sex classrooms in a co-educational institution.³⁰ After it became apparent that this phenomenon was exploding, a foundation headed by Dr. Leonard Sax in Washington, D.C. was founded and named the National Association for Single Sex Public Education which documents as well as provides information and teaching techniques to promote and assist schools interested in single-sex education for their students. Sax and the NASSPE will be the focus of much of this paper due to the centralization of the single-sex classroom movement under Sax's organization.

The remainder of this thesis paper will explore in-depth the single-sex classroom option as a potential solution to the achievement gap between girls and boys in public schools. Since the decline in achievement is first noticeable as a function of gender in the late elementary through middle school years, I will focus on the schools and situational learning environments which are using single-sex classrooms from fourth through eighth grades. I will assume a "race blind" approach to each of the following issues. Although it is important to note that many of the issues discussed below fluctuate between and within races, I will focus on the divisions between genders only, as does much of the single-sex literature.

³⁰ Ibid. Accessed 10/16/2006.

In this thesis you will find an examination of the following issues:

- What are the main aspects of single-sex education within a co-educational environment and how does this seek to solve the achievement gap in pre-adolescent and adolescent classrooms?
- Social Construction of Gender versus Biological Deterministic view of Gender: How does this play a role in single-sex or co-educational education?
- How does single-sex education address issues of violence, harassment and aggression that have been found to have a profound affect on a child's learning ability?
- What variables complicate this issue and why are they important when considering if single-sex education is the appropriate direction for America's children?
- What may be lost in single-sex education? Why may co-educational settings be beneficial to most children?
- Does single-sex education actually provide the root to a more egalitarian society, or does it divide children farther? What may the future look like if children are segregated along gender lines on a large scale in public schools?
- Finally, what are the legal issues surrounding single-sex education in public schools? What legislation supports this option, and what will pose a challenge to single-sex education advocates?

As single-sex classrooms expand in popularity, I feel it is important to not only take a detailed look at what a single-sex classroom in a public school is like, but to pause and ask questions about how this is affecting the children of these schools. Some of these are unanswerable at this point and require more careful examination and longitudinal studies, but please consider: Are the students experiencing actual improvement in their academics? How is this affecting their social growth? Are single-sex classrooms solving the problem of teacher bias? Are teachers less or more likely to engage in gender stereotyping generally and in math and science in

particular? Is this improving sexual harassment in classrooms and in hallways? And finally, and I believe most importantly, how will this affect school girls in the future? Single-sex classroom advocates hail fewer discipline problems and a rise in standardized testing scores, but are we, as a society, willing to trade possible future opportunities for girls for higher test scores, or a less disrupted class?

More than a Trend: The Emergence of Single-Sexed Classrooms in Public Schools

Thirty years after the passage of Title IX of the Education Amendments of 1972, it may seem surprising to be discussing the merits of separating girls and boys in public schools and fifty years after *Brown v. the Board of Education*, it may seem even more surprising to hear advocates for single-sex education proclaim that a separate education *can be* equal. All across the country, however, the ideas and feelings seem to have changed since civil rights era America. No longer does there seem to be a loud cry for integration of both the races and sexes. In its place there are a vast number of newspaper articles proclaiming new single-sex classroom options in public schools from California to Philadelphia. *The Press-Enterprise* from Riverside, California proclaims their local Murrieta middle school has joined the other 240 public schools in offering single-sex classes.³¹ *The San Diego Union-Tribune* recently ran an article discussing the wide-spread appeal of single-sex education as a problem solver for discipline problems in classrooms and a local principle hailed the importance of choice for all students.³² Many other similar articles abound and almost all of these articles have three things in common: the first is that they all state emphatically that the students are receiving an equal education, only they are learning differently; the second is that the teachers who comment say they change their teaching style to “favor” the gender she or he is working with and this change is only contributing to the students’ learning environment; and thirdly, each mentions or

³¹ Claudia Bustamante, “Learning Styles: Gender-based classes let teacher refashion approach,” *The Press-Enterprise*, (Riverside, Ca: Sept. 10, 2006).

³² Diana Jean Schemo, “Single-sex Classes Backed,” *The San Diego Union-Tribune* (San Diego, CA: October 25, 2006).

emphasizes the support received from Dr. Leonard Sax and his institution for single-sex education. Since these three points seem to pervade the articles from across the country, it is important to explore the first two features and determine more precisely what is meant by “learning differently, but equally” and “tailoring teaching practices to separate genders,” both of which promote evidence from Dr. Sax and the National Association for Single-Sex Public Education. Before visiting these in detail, it is necessary to explore two theories of gender which form the base disagreement between single-sex advocates and those who disagree that single-sex education is a solution.

Nurture or Nature: Theories of Gender

Shaping and Reshaping: Social Construction of Gender

In order to reach the heart of single-sex schooling and to understand the arguments for both advocates and opponents, it is important to take a moment and distinguish some important terms. First, the difference between the terms “sex” and “gender” must be explained in more detail. Dr. Sax and many advocates of single-sex education will use the terms interchangeably; however, there is an important distinction which must be made that seems to be overlooked by much of the literature on single-sex education. “Sex” is defined as a biological entity, and it is said that one is born male or female and this is their sex. It is also what single-sex schooling describes: dividing classes by the students’ biologically determined sex. “Gender” is, however, to be understood as something different, a formation of a group of characteristics that society recognizes as masculine or feminine. Although I will concede, that certain aspects which participate in the forming of gender are of a biological nature (hormones that promote facial hair growth in men but not women, for instance), the majority of the formation of gender is a “cultural construction.”³³ In society, however, a child is never without a gender, since a gender is not spontaneously created one day, but “always already exists,” but gender, unlike sex, is a continual process of invention and is constantly being experienced through different contexts during socialization continuously.³⁴ Gender is a dichotomous social invention, where society places on the subject the qualities which it has determined

³³ Judith Butler. “Variations on Sex and Gender: Beauvoir, Wittig, Foucault,” *The Judith Butler Reader*, ed. Sara Salih (Malden, Mass: Blackwell Publishing, 2004), 21-24.

³⁴ Ibid.

are appropriate to its sex. To be more concrete, one is born male or female (its sex) based on the sex organs, however, maleness or femaleness as genders are created continually as the child grows. For instance, femaleness, in the gender-sense, in most Western societies, invokes more ideas than simply a subject which possesses a vagina. Femaleness invokes ideas of childrearing, fertility, kindness, patience, and even can go so far as to bring to mind the color pink. In gender creation, society's ideals of how a person should act or which social sphere they should occupy is pushed on the subject in order to form their gender and this gender can present restrictions on the lives of the subjects which fill them. These preconceived notions of how a person of a certain sex should behave are termed gender stereotyping. In careful observations on the playground, children are seen not only to *be* socialized by parents, teachers, or society, but also have an active role in participating in their own socialization as well.³⁵ A pertinent example of this is when a group of children in a classroom are learning a reading lesson, and a male student misreads a sentence. Although the teacher may not say anything or act differently at the mistake, a female student may remark that it's because he is a boy and boys do not read as well as girls. Here, children in social groups are recreating the things they unconsciously accumulate and applying them in their own smaller social group. Sex and gender are closely related, but cannot be used interchangeably. Sex is strictly biology, where gender embodies the role that the subject is to fill, or even "perform," in society. Sex

³⁵ Barrie Thorne. *Gender Play: Girls and Boys in School* (Buckingham, UK: Open University Press, 1993), 3. (Italics mine.)

is finished and defined at birth where as “gender is an active and ongoing process.”³⁶ In essence, this is termed the social-construction of gender. Without social restrictions, there is very little difference between males and females other than what is biologically present at birth. Many see this view flowing naturally into the view that co-educational classrooms can be equally effective for both sexes once stereotyping is removed.

Not all accept the notion that gender is socially constructed. Many advocates of single-sex education, including Dr. Sax, believe that most of the characteristics present in a gendered subject are biologically determined.

It Is the Way It Is: The NASSPE and Biological Determinism

Dr. Leonard Sax is a M.D. and Ph.D., who runs the National Association of Single Sex Public Education. He is a leader among those who do not accept the social construction of gender, and therefore embrace the idea of single-sex public education as a way to best educate girls and boys who inherently learn different. Dr. Sax will use the terms gender and sex almost interchangeably, as stated above, using one over the other in instances “that seemed best suited in each context to minimize confusion.”³⁷ In fact, Sax, as well as other biological determinists, state that the main problem with identifying what works in education is that “the influence of social and cognitive factors on gender has been systematically overestimated while innate factors have been neglected” in children.³⁸ What are these innate differences and how

³⁶ Ibid., 4.

³⁷ Leonard Sax. *Why Gender Matters: What Parents and Teachers Need to Know About the Emerging Science of Sex Differences* (New York: Broadway Books, 2005), 263.

³⁸ Ibid., 263.

do they translate to a need for more single sex education? Sax and the NASSPE enumerate these factors for us.

Innate Differences: How Our Brains May Be Gendered

Unlike social construction theorists who believe that gender is a continuous variable based on the sex's social surroundings, biological determinists believe formation of gender is much more concrete. Sax begins his argument by stating that not only are hormones that create different chemical reactions biologically responsible for the visual difference in men and women, but even more basic is that their brains are different too. Sax quotes Harvard neurologist, Norm Geschwind's study that showed that hormones may result in a male brain that was highly divided with one hemisphere devoted to verbal tasks and one to spatial tasks, while women's brains did not demonstrate the same division and were more likely to use both hemispheres for each type of task.³⁹ Not only are hormones responsible for male and female functional brain differences, but Sax suggests that each sex's brain tissue is "intrinsically different" from the other, resulting in unchangeable biological differences in brain activity and therefore, behavioral activity.⁴⁰ The variation within gender that was suggested above by social constructionists which are mediated by society, as Sax suggests, is an inaccurate description since there is no way to alter the brain tissue. Since the anatomy is different, then Sax suggests learning is different as well.

³⁹ Ibid., 12.

⁴⁰ Ibid., 14-15.

Sax uses many scientific examples of studies involving young girls and young boys which determine that visual systems of boys and girls are wired differently and suggest that the sex difference in toy choice may be connected to this biologically different system set-up. He then backs this theory up with examples from the animal world saying that both girl monkeys and girl humans would choose dolls over trucks because the wiring in their P cells of the retina makes a doll more interesting since there is more detail in her construction which appeals to a girl's P cells. *Why Gender Matters* then continues to do this with several other anatomical systems, describing how the differences in the way women give directions versus men is a function of the difference in the way women use their cerebral cortex, and that children's ability to learn and play is different from one another based on research that suggests that children who are too young to determine their gender still choose tools deemed "gender appropriate."⁴¹ In a study by Dr. Ann Campbell, very young boys choose trucks over dolls even when they could not directly identify themselves as a boy, or as a girl. Her conclusions were that "the impact of cognitive (or learned) variables may have been overestimated."⁴²

Not only in younger children does this brain difference become relevant, but in early adolescence brains behave differently in a way that is not connected to the sex hormone activity that is occurring at this time. In a study at Harvard, an MRI was taken of children ages seven through seventeen to see how negative emotional activity registered in the brain. This study demonstrated that emotions or feelings

⁴¹ Ibid., 26-27.

⁴² Anne Campbell, et al. "Infants' Visual Preference for Sex-Congruent Babies, Children, Toys and Activities: A Longitudinal Study." *British Journal of Psychology* 93 (2002): 203-17.

were biologically different in males and females. The fraction of the brain that handles the processing of negative emotions was found to be anatomically higher in the brain in females than males, and had moved there during adolescence. The situation of this section of the brain resulted in a girl being able to talk in detail and vividly about her emotional feelings, while boys of the same age were not able to accurately describe their feelings.⁴³ There are other examples of specific differences that have been reported in male and female brains, but how does this affect their learning?

Learning Together...or Separately?

Sax and others believe that because brain make-up and chemistry are different then this will affect the way that school children of each sex learn. Single-sex advocates see the human brain as “sexualized and genderized...where the female is strong” in verbal skills and males are strong in “spatials and higher math or science.”⁴⁴ Sax makes clear, however, that this does not entail a digression into the world of gender stereotyping which can harm children’s opportunities and is not necessarily connected in anyway to the different brain anatomies of girls and boys. Sax will say, however, that most gender stereotyping is inaccurate and does not advocate using stereotypes to categorize children. He will say that in some ways the brain chemistry will affects the perceived gender of a child in very predictable ways, even when a child attempts to “break the mold.” Children described as tomboys or

⁴³William Killgore, et al., “Sex-Specific Developmental Changes in Amygdala Responses to Affective Faces,” *NeuroReport* 12 (2001): 427-33.

⁴⁴Michael Gurian. *Boys and Girls Learn Differently!* (San Francisco: Jossey-Bass, 2001), 204.

girlie-girls, lesbian or straight women, will demonstrate predictable female characteristics because of their brain chemistry, according to Sax.⁴⁵

Many stereotypical views of girls contain no data which support these generalizations, but some views of girls do have support such as girls are less likely to take risks, and girls are less likely to try something new without outside support. In education it becomes important to determine which are which in order to best respond to each situation in a classroom to encourage each student to do their best; in effect, tailoring teaching practices to gender.⁴⁶ Although many single-sex classroom advocates seem to feel that most learning and processing abilities are innate, it is interesting to note that Michael Gurian suggests that children are “naturally inclined toward coeducation, but also toward separate-sex groupings.” It is important then not to force single-sex education on a school by only pointing out its potential advantages, but to examine whether single-sex classrooms would be an advantage to their particular district.⁴⁷ This stance is a slight shift from Leonard Sax’s where he suggests *all* children would best benefit from single-sex education.

A few particular instances in education stand out which Sax suggests are the basis of the need for separate learning environments between boys and girls. One of the main points that seem to affect girls in school, and other areas of their life is the idea that they may be more unwilling to take risks. It seems that this particular gender stereotype is a combination of the female brain’s reacting to a fearful situation in a way that may trigger a “flight” response, where a male brain may trigger a

⁴⁵ Leonard Sax, *Why Gender Matters*, 35-37.

⁴⁶ Ibid., 33-36.

⁴⁷ Michael Gurian, *Boys and Girls Learn Differently!*, 203-204.

“fight” response when faced with the same stimuli. Girls, however, may also experience what has been termed “learned helplessness” by society, in which a girl is more often encouraged to look to a male, or a guardian to help or save her, while boys are more often encouraged to use their independent skills than rely on another although it is undetermined how learned helplessness and brain chemistry actually interact to produce a separate effect for girls.⁴⁸ In a classroom setting, risk can be an important to development in both girls and boys. Sax suggests that where boys often need no encouragement to try a new activity or skill, girls may need extra encouragement and a careful onlooker in case she first fails at a task to renew encouragement. A similar technique can be used to encourage girls to scream and make noise where they otherwise would not feel comfortable breaking out of a quiet role.⁴⁹ Through an adaptation of these techniques, Sax suggests that teachers or parents use the knowledge that risk taking or quietness can be biologically linked to gender and use appropriate encouragement for girls to help build “their character” and give them “self-confidence, resilience, and self-reliance.”⁵⁰

Problems other than the willingness to take risks surface in many classrooms across the nation and concern both boys and girls. Many of these problems are at the forefront of the social constructionist/biological determinist debate. For girls, the biggest gap academically does not surface in early elementary years where risk is a factor, but later on, in early middle school, and may last through high school. This is the gap between achievement in math and sciences. Many stories surface in which

⁴⁸Leonard Sax, *Why Gender Matters*, 47.

⁴⁹ *Ibid.*, 50.

⁵⁰ Wendy Mogel, *The Blessing of a Skinned Kneec* (New York: Penguin, 2001).

girls drop or feel pushed out of science and math, particularly as the level of difficulty rises. As mentioned above, studies show the drop in achievement seems to follow not precede the drop in confidence in the subject areas. Biological determinists believe that the drop in confidence is not necessary a result of stereotyping, but believe it is a result of the lack of understanding between sexes. In many ways a student-teacher interaction can affect the student, particularly a girl student, much more than consciously known by the teacher. Some instances of these interactions result in possible sexist behavior towards girls in classes where they are typically underrepresented (i.e. physics).⁵¹ Sax suggests, however, that this behavior on the part of teachers (particularly male teachers) is not sexism; it is simply a lack of understanding of the ways in which girl students and boy students' expectations of a classroom differ. Girls are often pushed out of classrooms where they encounter difficulty because girls are more likely to be affected by a negative teacher relationship or a negative comment from a teacher, since girls give great weight to teacher opinions about themselves and their work. If a girl feels her relationship with a male teacher is hurt by her inability to achieve the highest grades in the class, then she is more likely to drop the class, and not return to the subject in the future.⁵² Girls are more likely to relate to other girls or women as "friends." Because of this, supposed biological trait, girls are more "likely to assume that the teacher is an ally or a friend" where boys see being friends with a teacher as "geeky" or undesirable. Teachers of girls therefore will have a better teaching relationship and provide the

⁵¹ Leonard Sax, *Why Gender Matters*, 80.

⁵² *Ibid.*, 81.

best classroom experience to girls by looking at them directly and smiling, which signal that the girl is liked by her teacher. Boys tend to relate better to a “mentor-student” relationship between him and the teacher in which the teacher sits next to the student and focuses the attention on the work, rather than their interaction.⁵³ It is more likely, in Sax’s opinion, that girls are pushed out of math and science classes because of a lack of understanding about girls versus boys’ educational styles by the teachers, than because of a sexist or hostile class environment.

The same is true for other aspects of learning. Girls seem to learn better being face to face with one another or a teacher and in shared cooperative group activities in the classroom which focus on a real life situation. Boys, on the other hand, are found to be much more likely to all want to face the same way, and learn independently, which Sax suggests is innate to their brain anatomy and chemistry.⁵⁴ Differences in hearing and light sensitivity are also cited as a biologically based difference that needs to be addressed differently for boys and girls. Since girls hear better than boys, a male teacher, who is biologically more likely to speak loudly, would potentially harm a girl’s classroom experience because she may feel that he is yelling, whereas a boy in the same environment may actually hear better than in a female led classroom.⁵⁵ Girls are also more adept to enjoy lower lighting, rather than bright overhead lights.⁵⁶ A similar difference is seen in confrontation in the classroom. Because boys are more prone to respond positively toward aggression, boys respond

⁵³ Ibid., 85-87.

⁵⁴ NASSPE website: www.singlesexschools.org. Accessed 11/15/06.

⁵⁵ Leonard Sax, *Why Gender Matters*, 88.

⁵⁶ Michael Gurian, *Boys and Girls Learn Differently!*, 23.

well to a teacher raising their voice to them or even kicking them out of the classroom where girls will be more likely to completely shut down if the same incident occurred to them.⁵⁷ All of these smaller factors change the experience of girls versus boys in the same classroom and Sax links them to unchangeable biological causes. By unchangeable, Sax is referring to the finding that brain tissue of males and females is “intrinsically different” which leads to the way children learn and perceive things. Because of the differences in brain tissue, children are unable to alter the way they participate in school. Sax, then uses an example where teachers may push a boy to draw people-centered pictures, but in doing this the teacher is actually harming the boy. Due to his brain tissue, he is more likely to please himself by drawing actions rather than people. When the teacher presses him to draw people, he will in order to please her, but will never stop wanting to draw only actions, due to his brain tissue.⁵⁸ A similar process will occur with other learning activities as well. Sax suggests that children are all fighting their biological nature and will never fully change their behavior, which is why he considers biological differences unchangeable. If this is true, teachers should take note or be taught these differences in order to best serve his or her students.

Sax suggests that altering teacher behavior toward girls in the co-educational classroom may not be enough to achieve a more equal educational outcome for each sex. For optimum classroom results in testing, single-sex classrooms will employ different teaching techniques to address the following issues—teaching separately but

⁵⁷ Leonard Sax, *Why Gender Matters*, 89.

⁵⁸ *Ibid.*, 14, 23-24.

equally. In the realm of aggression, which I will visit in a later section in much more detail, boys and girls' misinterpretation of each other's behavior can cause a "special risk" for each group. There is some biological evidence to suggest that boys are programmed innately, as a function of greater levels of testosterone, to accept and employ aggressive behaviors playfully to begin or strengthen friendships, while girls do not accept violence as a part of friendships. When these two sexes interact, they can potentially have a distracting affect on both sexes. An example is that if a boy pulls a girl's hair, he may be attempting to bridge a friendship with her, while the girl will interpret the action as mean, and withdraw from the boy, creating a potential disturbance for both actors. Sax suggests, and some other studies demonstrate, that explaining the differences between a boy's and girl's interpretation of aggression to a girl student will not be understood, and attempts to remove aggression altogether is ineffective and creates a sort of surplus repression for male children.⁵⁹ Through separating children of late elementary school through middle school, much of the disturbance and confusion brought by forcing a daily interaction between the genders can be controlled until later, when students more readily accept and understand each other's differences. In a single-sex environment, students will be more able to concentrate on the tasks without being distracted by the members of the opposite sex.⁶⁰

Other differences focus on the previously discussed hearing discrepancy between boys and girls. Teachers in an all-boys classroom will gain better results by

⁵⁹ Patricia Cayo Sexton, *The Feminized Male: Classrooms, White Collars, and the Decline of Manliness* (New York: Random House, 1969), 3.

⁶⁰ Leonard Sax, *Why Gender Matters*, 62-63.

speaking louder at a pitch more receivable to the male hearing mechanism where teachers of all-girls classrooms would do better to speak more softly.⁶¹ The same situation applies when discussing teaching organization, as well. Boys have been shown to learn better in a more stressful, or confrontational environment where they are more independent from the other students. Girls, however, have been shown to be relationally more aware of others and thus learn better in groups, where they can quietly interact and cooperate toward a solution with more room for error and encouragement both from the teacher and from the other group members. This has been shown to relate particularly to the differences in standardized tests for both girls and boys. One factor that has been shown to contribute to the difference between girls and boys in math skills on standardized tests is that boys are more positively affected by the stressful situation of the test, where as the same situation could signal chemicals in the brain in a female that causes a different or negative reaction to the stressful situation, causing her performance to drop.⁶²

An interesting distinction to note in regard to standardized tests is that performance, as opposed to ability, may be related to sex; however, ability in math does not seem to be causally related to sex. Specifically, studies “on sex difference in mathematics abilities do not yield consistent results.” It is the confusion between performance and ability that can be hard to distinguish.⁶³ This is important to note because although biological determinists show some evidence relating brain activity

⁶¹ Ibid., 90.

⁶² Ibid., 92.; Talia Ben-Zeev, et al. “Math is Hard!: Responses of Threat vs. Challenge-Mediated Arousal to Stereotypes Alleging Intellectual Inferiority,” *Gender Differences in Mathematics*, 189-203.

⁶³ Jeremy B. Caplan and Paula J. Caplan, “The Perseverative Search for Sex Differences in Mathematics Ability,” *Gender Difference in Mathematics*, 29.

to different stress reactions in male and female students, it does not then follow that girls and boys actually possess different levels of ability in each subject. In fact, it is hard to separate a sex difference in mathematics, or other abilities, learning processes, etc. without this difference being confounded with many variables to be discussed later.

Before leaving this section, it is important to make clear that sex differences in social situations and in learning are larger and impact the child greater in young childhood toward adolescence than in adulthood. In fact, by “thirty years of age, both females and males have reached full maturity of all areas of the brain” and thus have greater ability to learn and master tasks in a number of ways, not necessarily related to their gender.⁶⁴ It is this reason that many schools are choosing to use the single-sex classroom option in fourth through eighth grades and even younger rather than upper level high school. It is also why I felt this grade range most relevant to a child’s future experiences, as this is the time when they are going through the most development.

⁶⁴ Leonard Sax, *Why Gender Matters*, 93-94.

Violence, Harassment, and Aggression in Schools

An outside factor brought to light by the AAUW study which affects a child's ability to learn is the social lives of boys and girls in schools. Reoccurring themes which effect children's ability to learn are violence, harassment, and aggression; the ways in which these themes can be mediated by single-sex or co-educational settings in schools will be the focus of the following paragraphs.

In a co-educational environment, girls and boys must learn acceptable tactics to negotiate each other's differences. In the social-constructionist view, many of these differences are not inherent but subtly encouraged by society. Peggy Orenstein touches on girls' fear of becoming the victim which is seen in schools all across the country. Through her observations in a mostly white co-educational public school, she sees how girls and boys come to "fit" their roles in the predator-prey dichotomy of boys and girls who are still learning to discover sexuality and appropriateness in terms of relationships and sexual orientation.⁶⁵ Girls come to see themselves as vulnerable and view this as inevitable since they see each other interact with more openly sexual boys. In classes, particularly health, or "sex-ed" boys sexuality is met up front with discussions of erection, ejaculation, and climax, where girls' sexuality is hidden under the veil of reproduction. Girls take this as a message of a need to hide their sexuality, which is then in turn reinforced by the "slut/virgin" label of the hallways.⁶⁶ Because of these factors, girls come to feel they must "hide" from boys, so as not to be changed from one label to another. Boys become the aggressors and

⁶⁵ Peggy Orenstein, *Schoolgirls*, 77.

⁶⁶ *Ibid.*, 52-54.

girls view themselves as hopelessly vulnerable. This is a power hierarchy that comes to exist in the hallways and classrooms that must be broken down. This hierarchy does not begin at adolescence but on the playground much earlier, as observed by Barrie Throne. Relationships formed on the playground must be looked at more closely because of ambiguous meanings of action which lead into the classroom. Both single-sex and co-educational classes evoke “recurring themes that are deeply rooted in our cultural conceptions of gender” blocking change from the status quo in either classroom setting.⁶⁷

“Teasing”: Explaining Away Sexual Harassment and its Effects

The play that is acted out in the halls and lives of these young students seems to repeat itself day after day. In some moments, however, it can grow into something more dangerous: sexual harassment or even violence. Of course, sexual harassment is a highly publicized area of American society, and generally not tolerated, but it seems to exist in schools under the banner of harmless banter. There are a few land mark cases where students have won settlements against their school districts for failure to prevent the harassment, but these seem few and far between.⁶⁸ The impact of sexual harassment is great in terms of a girl’s social ability to interact with both sexes of her peers and teachers, but it reaches into the classroom as well. Since girls are overwhelmingly the victims of sexual harassment and boys are the aggressors, this

⁶⁷ Barrie Throne, *Gender Play*, 66.

⁶⁸ For more information on the biggest school sexual harassment suit to date, see U.S. Supreme Court. *Franklin v. Gwinnett County Public Schools*, 503, U.S.60, no. 90-918, 1992.

problem is a contributing factor to the loss of self-esteem and the formation of the achievement gap.⁶⁹

The consistent act of harassment in the hallway contributes to a building effect, where boys come to see girls as “less-worthy of respect” and this carries over into the classroom where boys come to feel a sense of “entitlement” to the right answers or more teacher attention, because they are the better or more respected sex.⁷⁰ Without teacher intervention, or proper information about sexual harassment, girls come to feel that there is little they can do to change their daily interactions. Too often, it seems, these interactions are dismissed as young adolescents exploring their sexuality and that boys use teasing (the word most used to dismiss harassment) to express their like of a girl classmate. This interaction, however, is much more damaging to girls’ self-images, which is already experiencing the confidence drop which occurs around the same time and may damage learning experiences by contributing to loss of voice and confidence in a girl’s abilities in math or science.⁷¹

In terms of education, it is easy to see why the violence or aggression of boys could be seen as a reason to separate children during this period of their lives. Social-constructionists, however, have used evidence, such as above, to demonstrate that the interactions between boys and girls are a product of society and will not disappear by simply separating the sexes. They are subtly encouraged by an unbalanced education of sexuality and an inert administration that insists through inaction that “teasing” is normal, or not a big deal. In fact, the label of “teasing” drives the genders into

⁶⁹ American Association of University Women, *Hostile Hallways*, throughout.

⁷⁰ Peggy Orenstein, *Schoolgirls*, 116-117.

⁷¹ Ibid.

separate spaces without the need to divide them physically.⁷² When it affects their classroom experience by reducing their courage or self-assessed abilities, it in turn reinforces the stereotypes that girls are not good in math or science. The way to prevent this phenomenon is not to separate boys from girls and encourage the already strained relations, but to fight the stereotypes by removing the negative behavior, by a teacher monitoring halls, for example, and severe punishments for those caught participating in harassment. In this way, children learn first hand that a confident girls' ability in the classroom when unaffected by harassment in the hallways. By confronting the problem, boys and girls learn of each other's merits on an individual basis not marred by sexual harassment or aggression.

Biological determinists, however, will say that this is simply a fight against nature. According to Sax and others, boys are innately aggressive, and are simply wired differently than girls, making them unable to communicate with the other sex effectively until after puberty. Just as the example earlier of a boy pulling a girl's ponytail as a sign of affection, men are biologically incapable of expressing their like of a girl in a verbal way, creating a barrier between girls and boys until much later in life. Because boys and girls are naturally different, according to these theorists, these differences should be "acknowledged, accepted, and exploited for educational purposes."⁷³ By discouraging violent behaviors, such as aggressive play at recess, or physical play in the hallways, the innate aggressive tendencies in these boys will not disappear. Instead, it is harmful to boys to bury these tendencies. If they suppress

⁷² Barrie Throne, *Gender Play*, 53.

⁷³ Leonard Sax, *Why Gender Matters*, 63.

these small violent behaviors, the boys may express this aggression later in much more unhealthy ways. Sax cites criminologist, Edwin McGargee in explaining that many violent crimes are committed not by very aggressive men, but by quiet men, who have a sudden rageful outburst.⁷⁴ The goal of embracing certain aggression is to allow the boys to feel comfortable with themselves and a characteristic that they are unable to change. The key in education is to not stop all aggression, but to channel it into something productive, such as a competitive learning game. Through this channeling, boys will embrace their natural aggression in a way that does not directly affect the girls around them.

Aggression and violence does not appear only in boys. Girls experience it too, only girls tend to express it much differently. Studies from both sides of this debate have shown that girls are more likely to be aggressive with words. Girls rely on alliances, name calling and exclusion to bully or show aggression. The main difference is that girls show aggression within girl peer groups, where boys show aggression within and between gender groups. Each is an innate tendency, however, according to Sax, et al., and girls should channel their aggression differently as well, by turning aggression into a cooperative environment that eliminates the formation of cliques or exclusion that is the main source of a girl bully's power. These types of activities will encourage girl interaction, which is needed, according to Sax, but will eliminate competitiveness.⁷⁵ Sax ignores, however, the benefits of what Thorne terms "borderwork." By placing girls and boys along side each other, they interact in ways

⁷⁴ Ibid., 64.

⁷⁵ Ibid., 76.

to loosen the ridged differences between the genders and may lead to cooperation, but not a total loss of identity within their own groups. As children participate in their socialization, they learn to police some aggression of both types with interaction between sexes.⁷⁶ This skill will be particularly helpful in the larger society.

Since boys and girls each feel the pull of aggression and potentially violence, proponents of single-sex education advocate the separation is beneficial to both groups. While separating each from the other, sexual harassment (which the NASSE never terms as such) will be less likely to occur for obvious reasons, and other aggressive tendencies can be dealt with in a more single approach method. All boys are more physically aggressive, so they do much better with a more physically active classroom that is competitively based, while an all girls classroom would have activities that encourage cooperation, and positive interaction between girls that does not exclude or discourage any student. Is this the way to solve aggression in the long-term? Sax thinks so, but we will visit this in the next section. Co-educational classes have not been greatly successful in tempering this aggression, violence and harassment; however, steps have been made to make each of these actions unacceptable within the school environment. School children of both sexes must learn that these behaviors are not appropriate in society and whether biologically based or socialized, each sex must learn to respect each other and the opposite sex through positive teacher role models who treat each sex equally without stereotyping and who encourage borderwork.

⁷⁶ Barrie Thorne, *Gender Play*, 64-65.

How We Define Success: Are These Classrooms Achieving Their Goals?

After enumerating the basic differences between advocates and opponents of single-sex schooling, it is time to turn our attention to the evaluation of single-sex classrooms. Is separating young school children by gender in their learning environment the best way to prepare them for the future?

First, it is important to say that there is very little evidence on these single-sex classrooms within a larger co-educational setting. Since the number of public schools exploring the single-sex option has expanded from about 4 in 1995 to 241 in 2006, the children who have experienced single-sex education are either not grown yet, or are very few in number and unrepresentative of children across the nation. It is the goal of this thesis, however, to look into some of the issues that cloud the debate between those that feel gender is constructed and those who feel the best way to teach children is to nurture their biological differences, which they believe are numerous and innate.

What Causes What?: Variables which Complicate the Study of the Achievement Gap

The lives of school children are not a vacuum. As many of the studies cited by both sociologists and doctors suggest, some variables cannot be controlled and can affect any result of a study on gender in either a co-educational setting or a single-sex classroom. One is the "stereotype threat." The stereotype threat was first introduced in relation to race, but applies to sex as well. Women stereotypically are perceived to have weaker math abilities than men in American culture. The stereotype could be a mediating factor, where girls confronted with a math test may feel the stereotype and

perhaps unconsciously play to it, meaning they perform below their abilities.⁷⁷ A complimentary study done by Aronson, Lustina, Good, and Keough showed this stereotype threat is a real independent variable by studying white undergraduate males in a math test with those typically thought to be even better at mathematics, stereotypically, Asian males and demonstrated that the white undergraduates underperformed in comparison to a control group of white undergraduates of similar abilities.⁷⁸ The stereotype threat can occur more often in co-educational environments; however, this is not to condemn co-educational classrooms on this variable. Single-sex classrooms in the context of a co-educational school do not escape the stereotype threat. The knowledge of boys that they interact with at lunch, recess, and other classes may affect their performance during tests, although no studies with this focus have been done.

Another factor is the fear of ostracism and gender identification. This is the possible problem that may occur in social groups throughout high school. Femininity, or female gender, is not seen as compatible with math excellence in many girls' experiences in school. Girls who do comparable to their male counterparts may experience marginalization by other girls, and be seen as not feminine or less feminine. In combination with this, girls who place a high level of importance on their gender identification tend to do even worse on math or science tests than do girls

⁷⁷ Jeremy B. Caplan and Paula J. Caplan. "The Perseverative Search for Sex Differences in Math Ability," *Gender Differences in Mathematics*, 37-38.

⁷⁸ J. Aronson, et al., "When White Men Can't Do Math: Necessary and Sufficient Factors in Stereotype Threat," *Journal of Experimental Social Psychology* 35 (1999): 29-46.

who place less importance on their femininity.⁷⁹ This change in perspective, or point of split between girls who identify more “narrowly” with their gender and those who do not, occurs around puberty; the same point where girls begin to show differences in math performance. The causes of gender identification are not known, although it is suggested that social forces surrounding each child can contribute to viewing their gender narrowly or widely. Other causes are suggested that gender identification is an independent variable that can interact with brain chemistry to cause a child to choose objects a construed by the child as more or less female, being drawn to dolls and not trucks for instance.⁸⁰ A single-sex or co-educational environment will not have an affect on this variable, if this is true. Because this variable operates most within gender groups, or within sexes, it would still be in play in single-sex classrooms. Single-sex classrooms do not remove this distraction to girls’ ability to perform on math or science tests.

Above I referred briefly to belief in one’s abilities as having an effect on their performance on math and other tests as a potential barrier to isolating the cause of the gender gap. This variable is sometimes termed self-efficacy, and was a real variable found in both the AAUW study and the more qualitative studies of Peggy Orenstein, Michelle Fine, and the Sadkers. Self-efficacy may operate on its own or in conjunction with other variables, such as the stereotype threat or family and peer group influence. In a study by Ewers and Wood in 1993, boys and girls were tested

⁷⁹Jeremy B. Caplan and Paula J. Caplan. “The Perseverative Search for Sex Differences in Math Ability,” *Gender Differences in Mathematics*, 39.

⁸⁰Anne Campbell, et al., “Infants’ Visual Preference for Sex-Congruent Babies, Children, Toys and Activities: A Longitudinal Study,” *British Journal of Psychology* 93 (2002):203-17.

in math abilities in both gifted sections and average sections. The findings demonstrated that boys had more self-efficacy in regard to math regardless of their actual ability, and in many cases boys tended to “overestimate their performance more than did females.”⁸¹ There is also correlation between self-efficacy and SAT math scores for high school girls. The more self-efficacy, even an overestimated amount, the better girls did on their SAT math sections. This correlation did not appear in male SAT math sections.⁸²

The importance of self-efficacy for girls is an important variable to consider when attempting to create the best possible educational experience for girls, so we must ask if self-efficacy can be improved by single-sex public school classrooms. Some newspaper articles have suggested, from quotes by students, that it does create a non-threatening environment in some cases, where girls can build their self-efficacy. This is a legitimate point by students and provides a positive example of why single-sex classrooms may work. We must, however, consider how this self-efficacy may be lost in either type of learning environment. As I said above, it is mostly impossible to separate this variable from other variables, particularly family, teacher, or peer group influence. These factors are not mitigated by simply separating students into single-sex classrooms. As pointed out in many studies, including Myra and David Sadker’s, teachers are partially responsible for a lack of self-efficacy. It is demonstrated that across the country, not only do teachers tend to unconsciously pay

⁸¹Jeremy B. Caplan and Paula J. Caplan. “The Perseverative Search for Sex Differences in Math Ability,” *Gender Differences in Mathematics*, 39.

⁸²Ann M. Gallagher, et al. “Gender Differences in Scholastic Aptitude Test Mathematics Problem Solving Among High Ability Students,” *Journal of Educational Psychology* 86 (1994): 2, 204-211.

more attention to the boys in class, but they also teach historically male-only centered lessons. In America's classrooms, AAUW and the Sadkers found that many teachers teach the very traditional male historical figures and use males in example problems and when questioned, children state they simply do not know any famous women.⁸³ The women in history, math and science are rarely the focus of many lessons and could be a factor in the loss of self-efficacy. When girls repeatedly receive messages that men are the only famous figures, or the only contributors in society, it can cause a drop in self-esteem, or the ability to feel capable in subjects. This unawareness of the other gender's perspectives may result in communication problems, or delayed drop in self-efficacy until later in the scholastic career if it is not addressed and built upon in earlier years. If teaching practices or curriculum are unaltered, this problem will likely not change in single-sex classrooms.

The teacher factor is discussed above, but can also be considered its own variable along with family and peer groups. These variables constitute a problem of attempting to figure out how to best improve a child's experience. It is difficult to isolate one of these variables as a factor affecting the child, and it is even more difficult to gain access to study the effects of child rearing on classroom achievement. One of the main problems with this undefined variable is that "sex-differential expectation and treatment contribute to sex differences in performance." In other words, the teacher or parent's own sex-based biases, or their belief in the biological determinist model over the social constructionist model may affect how they treat a

⁸³ David and Myra Sadker. *Failing at Fairness: How America's Schools Cheat Girls* (New York: Charles Scribner's Sons, 1994), 6-7.

girl versus a boy.⁸⁴ Parents who believe girls are just not good at math, may not encourage their daughter to take an upper level math class, or be less willing to help with homework, or encourage persistence on a difficult problem.

Conversely a parent or care giver who allows their children to explore outside defined gender expectations may create a variable where their child is more likely in either single-sex or co-educational classes to excel at a particular subject independent of their sex.⁸⁵ These subtle expectations can influence a girl's interests and performance in math and science classes. Experiences in the classroom with teachers not only have been shown to affect the way girls learn or relate to the material, which in turn can affect their interest or perceived ability, but these experiences can be altered by teachers to encourage both boy and girl interest in the same subjects, eliminating the gender factor altogether.⁸⁶ The similar effect occurs with parents: a parent's experience or gender bias can affect a child and influence their choices or interest in a particular subject.

Class sizes and classroom resources are variables where evidence has been found to complicate the study of whether single-sex classrooms make a difference. Class sizes in single-sex classes are smaller, due to the selectivity of many of the current single-sex options. Classroom size has long been considered a factor in children's ability to concentrate, teacher attention and access to class resources, all of

⁸⁴Jeremy B. Caplan and Paula J. Caplan. "The Perseverative Search for Sex Differences in Math Ability." *Gender Differences in Mathematics*, 40.

⁸⁵ Myra and David Sadker, *Failing at Fairness*, 256.

⁸⁶J.S. Eccles, and J.E. Jacobs, "Social Forces Shape Math Attitudes and Performance," *Signs* 11, no. 2 (1986): 367-380.

which contribute to improvement academically.⁸⁷ Once again, it is hard to determine which of these many factors, or which combinations can contribute to the potential rise in academic standards in single-sex classrooms that may have little to nothing to do with the separation of sexes.

The peer group is a volatile variable, however. Teachers' and parents' attitudes seem to directly correlate with a child's interest or self-efficacy, however, peer groups can either encourage a child to move beyond a stereotype, or strongly reinforce the stereotype, both of which are powerful conscious or unconscious forces. In research into the relational worlds of girls, Lyn Brown and Carol Gilligan found intensely complicated and conflicting relationships which varied greatly, but almost always exhibited sensitivity to their peers. Some girls found that they were not listened too in their peer groups, or had to just go along so as not to be singled out, afraid to speak up because "nice girls make more friends."⁸⁸ Other girls experienced instances of empowerment when standing up to someone within their peer group, and in turn began a relationship with a new girl or a new peer group which formed for them a new source of confidence, although some of this interaction is muffled by the presence of a teacher which incorporates another variable.⁸⁹ Each new interaction in Brown and Gilligan's account provides examples of the complex dynamic among peers which emphasizes the individuality of the child and their experience in school, inside and outside the classroom.

⁸⁷ John Folger, "Lessons for Class Size Policy and Research," *Peabody Journal of Education* 67, no. 1 (1989):123-132.

⁸⁸ Brown and Gilligan, *Making Connections*, 45.

⁸⁹ *Ibid.*, 46.

Loss of Individuality: What happens to Children Who Do Not “fit the mold”?

The variables above are important to assess in the search for which educational method provides the most benefit for our students, and whether or not the single-sex classrooms achieve their goal of a better educational environment. Each variable, or situation, would possibly benefit from either single-sex environment or co-educational environment; however, we are assuming what Leonard Sax and other biological determinists assume: that all girls act similarly and all boys act similarly. This assumption is leading us away from the social constructionist theory and toward a biological determinist theory. It is important, however, to remember that each child is an individual. It is the exceptions that I believe show the clearest case for accepting a socialization approach to child development by demonstrating that children of the same sex can have different likes and natures, that often do not correspond to the innate biological differences in which single-sex advocates believe. When looking at this evidence which demonstrates that single-sex classrooms may exclude a large number of children rather than serve their educational needs it is easy to advocate a co-educational environment for public school students with greater emphasis on inclusion and a change in pedagogical techniques as well as a more well-rounded curriculum. A co-educational classroom will serve more children and provide the best environment for socialization for their futures.

Children are all different, even those that one would consider “normal.” mainly the children who are discussed when single-sex classrooms are talked about. The problem that considering children in terms of “normal” versus “not normal”

(children who have learning disabilities, problems socializing, ‘tomboys’, ‘sissies’, gay, straight, bisexual, or transgender) is that children who are labeled “other” take on a host of problems that occur outside of the classroom, but very much effect their learning experience.⁹⁰ When separating girls and boys by sex, we are assuming that all girls will act similarly, respond to lessons similarly, and like similar things and the same for boys. Children, however, exist all along the spectrum of highly gender identified (discussed above) to identifying with the opposite sex more frequently--just as many adults do. In co-educational classrooms, as well as single-sex classrooms, children struggle with their identity and undergo peer pressure and societal pressure to conform to ideal versions of their sex, and those who do not are ostracized. This is a problem among co-educational public school children, but I would contend that single-sex education actually makes the problem worse for many children by creating another defined group from which they can be excluded. This particular difficulty of “not fitting in” can be attributed to students across all ranges which are daily labeled by their peers and teachers as not normal. When a particularly smart girl described her experiences in middle school she described it as a “torture chamber” where no one would speak to her and she did not fit in at lunch or in the classroom because of her intelligence.⁹¹ By separating into single-sex classrooms, this girl would possibly be pushed out further by creating another defined grouping which could “other” her.

⁹⁰ The terms above are used in a way that Sax uses them in *Why Gender Matters*, Chapters 9 and 10 specifically. These are not clinical definitions, and it is in no way the intention of this author to use the terms “normal” or “not normal” to label children. I use these terms in the way Sax uses them in order to stress the point that using these simple terms actually reinforce the problem of ostracism among children.

⁹¹ Myra and David Sadker, *Failing at Fairness*, 92-93.

By engaging in the rhetoric of sex and gender, which will be discussed below in more detail, children in single-sex environments are consistently aware of their gender. They are living it every day, and are expected to act like those around them: to act like girls. They are taught as girls are said to learn best, and expected to enjoy the things girls are said to enjoy. It becomes a reinforcement of female stereotypes. Those children who do not fit the stereotypes are then not in an environment best suited for their learning once separated into a single-sex classroom. Sax and other single-sex classroom enthusiasts will claim that girls feel more “free” to explore outside their defined gender roles in single-sex classrooms, leading to greater interest in previously male-dominated subjects such as math and science. This claim does seem to have some merit and is based on quotes used continuously by single-sex classroom advocates to show girls are making greater advancements in math and science. There is little qualitative evidence, however, that girls are actually making widespread advancements in math and science in single-sex classrooms, but there is evidence that certain pedagogical techniques do foster interest in math and science for all school children. In *Failing at Fairness*, Myra and David Sadker make a point to discuss the effects of a sexist curriculum on school children. Not those around them, but what were in their readers, math, science, and history books, coupled with unconscious sexist teaching practices (discussed above in *The State of Public Education*) had a much greater impact on increased belief in stereotypes. Without real knowledge about women of different fields, “the children filled in the gaps with stereotypes and distortions.”⁹² Although this does not completely answer to the claim

⁹² Myra and David Sadker, *Failing at Fairness*, 73.

that children may feel freer to explore in a single-sex environment, it does provide evidence that single-sex classrooms may not solve the problem of stereotyping on its own. Furthermore, in single-sex classrooms within a larger co-educational environment, girls will still have interaction with males, limiting this claim that freedom can be achieved in a single-sex environment. Without a change in curriculum for both sexes, neither can begin to build connections through common knowledge and history of the other sex. Through dichotomizing boys and girls, there is little interaction in which to build comfortable connections. The smaller and more defined a solidified group becomes, the less space for a child who does not fit exactly into the mold of their sex, and the fewer people they have access to in order to engage in borderwork. Sax will say that it is not true that girls are limited in single-sex environments, but provides virtually no concrete evidence to prove this claim. It is hard to believe that a girl who is expected to like cooperative work, but does not, will be receiving less pressure to conform to the stereotype. In a single-sex classroom, the pressure to conform to what Sax says is biologically correct way of learning is in some ways worse than subtle sexism. Single-sex classrooms institutionalize stereotypes by placing pressure to conform not only from informal peer groups, but from teachers, school districts, and parents as well. This overt pressure can be exceptionally difficult for a child whose identity may not conform to the white heterosexual ideal that seems to be the dominate ideology of single-sex advocates.

Girls who may lay lower on the continuum of femininity may not identify with group learning or relate to a soft-spoken approach (both of which Sax advocates

for girl-only classes).⁹³ Biological determinists will assert that because it is biologically based, the only reasons that a girl would not relate to those techniques would be if there was a physical problem with the child, however, there are countless examples in my life that have been documented of female students who prefer to learn in a competitive environment, or who dislike group work. As one woman, in an editorial stated it: "Have we ever met girls who must get up and move around without getting in trouble...Do you know a boy would appreciate begin greeted by soft, instrumental music?"⁹⁴ Each of these approaches is suggested to improve learning for the opposite sex, but it seems obvious that not every child is the same within their sex.

Sax's approach to these children is to recognize the "atypical" behavior in your son or daughter early on and encourage sex-specific behaviors (encouraging sports for boys and dance for girls), because in the long run it will best benefit him to embrace his biological differences and use them as resources in learning.⁹⁵ Sax states that this is not gender stereotyping, only an embrace of natural behaviors. I disagree, and so would many others. Encouraging children to be something they are not, or to participate in an activity that they are uncomfortable with, sets them up for an inner conflict-- they can participate to please their parents, or they can please themselves but cause a rupture with their family, teachers or peer group. Studies have shown that in many children, pushing them to ignore a part of their identity and giving them no

⁹³ Leonard Sax, *Why Gender Matters*, 87-88.

⁹⁴ Stephanie Dorman, "Same-Gender Classes Deny Pupils Beneficial Experience" *Columbia Daily Tribune* (Columbia, Missouri: September 7, 2006).

⁹⁵ Leonard Sax, *Why Gender Matters*, 227-228.

access to a vocabulary to explain emotions, effectually silencing thoughts, can have devastating effects on a child and family.⁹⁶ In the realm of single-sex classrooms, children who are pushed to participate with only members of the same sex may also cause an unhealthy rupture where they are not learning, or do not enjoy the classroom experience, but are unable to speak up because of the outside pressure to be “one of the girls” or “one of the boys.” If this child does speak up, where are they to go?

Many public schools offer single-sex classrooms as a choice, which the NASSPE advocates and is currently required by law, but once the child is put into the program (usually by the parent) they must be removed by the parent or teacher for a particular reason. If teacher or parent pulls the student out of single-sex classes into co-education, that child must then explain why. At age 9-14, children may not understand why they are different, and may not be able to explain it to others, creating a situation of speculation by gossiping pre-teens and potential peer isolation.

⁹⁶ For more on this line of reasoning, see Herbert Marcuse, *Eros and Civilization*, (Boston: Beacon Press, 1955). For an overall history of the formation of emotional repression by society on children, see Peter N. Stearns, “Girls, Boys, and Emotions,” *Journal of American History* 80, no. 1 (June 1993): 36-74.

Losing Out: What Single-Sex Education Is Missing

Thomas Jefferson wrote six “objects of primary education.” The first three included importance on individual success while the final three pointed to the ability for our students to participate in the public arena. This balance was discussed in the open paragraph and must be constructed in the public school system to serve both goals.⁹⁷ I would think that in service to young school children, all of these goals include considerations of their developmental processes and daily experiences among other school children and the larger society must be taken into account. When it comes down to single-sex classrooms or co-educational experiences, a weighing takes place. Although some developmental processes vary according to hormones, or placement of particular neurons, and these can be documented as differentially occurring brain patterns in males and females, it is an extraordinary leap for biological determinists to make from identifying brain activity in male children while they are discussing their feelings, for instance, and connecting that to their inability to learn in a more verbal cooperative environment.⁹⁸ Studies cited by the NASSPE suggest some anatomical brain differences, but there is no section of the brain for “group work” or “sexual harassment” as these are changeable social constructions that are not ruled by brain processes, therefore have no impact on a child’s ability to participate in these and other activities which affect classroom experience. Dr. Sax and the National Association for Single Sex Public Education conflate many issues

⁹⁷ Hochschild and Scovronick, *The American Dream and the Public Schools*, 17

⁹⁸ There is evidence for brain differences in males and females in this particular context, but in no way does Sax or other single-sex educators connect brain activity to an “unchangeable” biological process that prohibits male children from acquiring the ability to express emotions more verbally.

and assume that because brain activity is different in certain circumstances, that child, male or female, should embrace those differences and it would be “unnatural” for them to change their behavior or thought pattern.

Even if we concede that there is some basis in biological determinism in reference to gender, Sax cannot isolate enough variables to prove, or even at best persuade, better learning in single-sex environments compared to co-educational environments. Many sociologists who have studied children closely have conclude that a social construction of gender is more prevalent than biology, but regardless of the belief in the formation of gender, the studies have been analyzed by the Education Department which found the studies to be “inconclusive,” as stated in the *New York Times*.⁹⁹ All of these single-sex programs are currently optional, but those children who choose to be in a single-sex environment select themselves (or their parents do) for many factors that are not consistent across individual, or sex. The self-selectivity bias briefly mentioned above may greatly affect studies of single-sex classrooms. Although some studies on this may suggest that scholastic achievement grows for some students in single-sex environments, they are inconclusive and are potentially unrepresentative due to the short length of the program. Parents, however, with struggling children may leap at the chance to improve their child’s grades (and why wouldn’t they?) although they are potentially misled by schools heralding this program. One example from Gilligan’s qualitative study of girls suggests that

⁹⁹ Diana Jean Schemo, “Change in Federal Rules Backs Single-Sex Public Education,” *The New York Times* (October 25, 2006). For more information on the specifics of how single-sex education is discussed by the Office for Civil Rights visit The Education Department website: <http://www.ed.gov/policy/rights/reg/ocr/edlite-34cfr106.html>. Accessed 11/1/06.

children engage in a struggle when faced with the problems of disagreeing with their parents. Although a behavior may seem “unfair,” that student’s struggle to name this unfairness is overshadowed by the parents seemingly “selfless love and concern.” In the end, placing all the responsibility on a parent to decide what program to place their child may actually end up leaving their child even more voiceless.¹⁰⁰ Once in the program, parents may perceive differences in their child’s performance that may in fact not exist, or be negligible. This child may be counted as a “success” when real change is not happening and she is not getting the attention she may actually need. In a single-sex experiment in 1905, boys who were separated began to receive much higher grades and “enjoyed the freedom from competition with the girls” although it was later found that the suggestion by the principal that boys would learn better if separated may have actually been the cause of the rise in grades. Teachers began to believe that the boys were doing better when in comparison to previous co-educational work they were doing the same quality of work.¹⁰¹

Other objections exist as well. As many people in editorials and press releases from National Organization of Women (who is one of the main opponents to this movement) suggest, if these children are separated at a pre-adolescent age and do not receive the interaction in the classroom, when will they learn to deal with their difficulties?¹⁰²

¹⁰⁰ Brown and Gilligan, *Meeting at the Crossroads*, 96-97.

¹⁰¹ David Tyack and Elisabeth Hansot. *Learning Together: A History of Coeducation in American Schools* (New Haven, CT: Yale University Press, 1990), 180.

¹⁰² Lisa Bennett. “NOW Opposes Single-Sex Public Education as ‘Separate and Unequal’.” NOW website: <http://www.now.org/press/10-06/10-24.html>. Accessed 10/30/06.

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Above I addressed the problem with isolation or feelings of discomfort when asked to identify solely with one gender or the other, with no room for a continuum of identity. If a child is perceived as “normal,” using Sax’s definition of a child who identifies strongly or semi-strongly with their sex and does, in fact, learn best in the ways he delineates that they should learn best, there are still important problems with single-sex classrooms. When children are separated by sex, they may lose the ability to cope with the other sex. For instance, boys have been found to be more aggressive in the classroom (whether this is biological or socialization is to be determined) and girls have difficulty being heard or report feeling invisible in classes. If they are separated, however, this may work to boost a girl’s self-confidence in speaking up, but when will she learn to overcome her fear and speak up even in the presence of a more aggressive person? I would suggest later in life, if at all, when it may be much more difficult for her to develop confidence in her strong voice and would result in many missed opportunities. The same principle applies to young boys. If they are placed in an environment of only other boys and are encouraged to be loud and competitive (a learning technique Sax suggests for boys) when will these boys learn to sit quietly when a girl, or a quieter person, wishes to speak?¹⁰³ Possibly never and this environment will serve as a potential socialization factor which could encourage aggressive behavior to spread to all the classroom boys. Although children may, momentarily, feel more comfortable in the presence of their own sex, the absence of the opposite sex provides children with important tools for coping with a multitude of situations with either sex and a classroom has been an appropriate place for many

¹⁰³ Suggested biological differences in Leonard Sax, *Why Gender Matters*.

years for children to learn to overcome obstacles. Children may feel more comfortable in some moments in single-sex classrooms, but children must also learn of each other's differences which they will be faced with eventually.

Similar reasoning follows for the activities that is suggested as an "embrace of natural" learning tendencies. Boys prefer more competitive work and individual work, and see their teacher as an authority figure only. Girls prefer cooperative group work, where they work side by side with other girls and teachers to foster a more "collective spirit." Life outside of a single-sex classroom, however, requires both kinds of work, group and competitive. Teaching only one technique does not prepare the child for work of the other kind, and may leave them behind in an environment where they have not been given all the skills to adapt and succeed.

Loss of different perspectives is another important loss in this program as well. The more homogenous a classroom becomes, the less understanding of others who are of different gender, race, socioeconomic class, or various other factors is learned. Pre-adolescent through adolescence is when children need to learn the skills of coping with things that may not be in their "nature" or comfort-zone. In single-sex classrooms although teaching styles are encouraged to change by single-sex educators, the actual required curriculum does not change. Students in public school are required to take the same standardized tests under No Child Left Behind. Teaching styles may change, and I would assert that they must change to remedy the male-centered and other biased lessons, but this is not a change that should only happen in girls-only classes. In order to provide efficient education for real-world

situations, it is important that all the public school children receive similar lessons. Having an all girl classroom, with women teachers may be more conducive to beginning a discussion on female historical figures, but male historical figures must also be taught to achieve a balanced view of society. In contrast, having a boys-only classroom with a male teacher may not even be consciously aware of the lack of women in history, or be reluctant to see it as a problem or an imbalance. It is, however, important for them to have a balanced view of society as well so as not to instill a subconscious view that women are not able to throw a ball in a physics problem, for instance. In single-sex classrooms, girls and boys are not pushed to think of the opposite sex and how they relate to material covered in class. This is a major problem of single-sex education: self-efficacy may decline in a co-educational environment with unchanged teaching styles and lessons, but this can be remedied through new lessons and awareness on the part of the adult, whereas when children are separated they lose sight of the other gender and become oblivious to the way each gender may have a separate reaction to material. These single-sex classrooms do not give them the skills to do this, and simply allowing them to intermingle at recess or lunch does not provide prolonged, varied instances of interaction that is necessary for children to learn different techniques and gain understanding and the ability to contribute productively to society. Currently, co-educational classes may be the better place for children to receive a more well-rounded education, but the status quo of the co-educational classroom must be changed. It is not simply enough to keep children in their current co-educational public school classrooms, but changes must

be made within these classrooms to best serve both boys and girls to foster equality in the classroom.

One Nation Divisible: The Future of a Gender Segregated Society

Stereotyping was discussed throughout this paper in many different context but needs to be explored in depth. Although Sax claims that by separating children, he is actually participating in an active removing of gender barriers and stereotyping, his logic is circular and irrational. On the front page of the NASSPE's website Sax claims to not embrace stereotypes, and believes co-educational institutions are the ones reinforcing gender stereotypes though "gender intensification."¹⁰⁴ Sax suggests in several places on this website, as well as throughout his writings that by separating the sexes, teachers actually remove the barriers to gender stereotyping. Evidence, however, demonstrates the opposite. Teachers who began using teaching techniques suggested to "embrace single-sex schooling" were unconsciously engaging in stereotyping at points. For example, Darla Novick, a middle school teacher in Kansas City used an activity within her co-educational classroom that divided girls and boys. Although the groups did work well cooperatively with their own gender, Ms. Novick gave them titles of "Boy Loggers" and "Girls who were Saving the Spotted Owl" which are unconsciously gender biased. Boys were given the "manly job" while the girls were given the job that was maternal and not physical. Also, Ms. Novick heralded the success of this activity by saying that the "boys had similar ideas and the girls all had similar ideas" therefore it went smoothly and quickly.¹⁰⁵ Success was not measured by learning, only the ease at which the activity was done. Although Ms. Novick was using a gender segregated activity within a co-educational

¹⁰⁴ NASSPE website: www.singlesexschools.org. Accessed 11/2/06.

¹⁰⁵ Michael Gurian, *Boys and Girls Learn Differently!*, 209-210.

classroom, she was participating in the solidification of gender roles in much the same way as would occur daily in a single-sex classroom. Here is an instance where co-education alone is not enough to achieve equality. Her techniques need to change to break down stereotyping and encourage learning without using stereotypical beliefs.

Through participating in the consistent rhetoric of gender and sex, these classrooms are consistently reinforcing those differences as solid and unchangeable. For example, when a teacher addresses a class, he/she tends to use the labels “boys” or “girls” and these labels are typically used in forms of “social control” in order to name children who are behaving or misbehaving. The problem comes when the children, themselves, begin to internalize these labels in order to maintain a “continuously available line of difference.”¹⁰⁶ This difference becomes solid with a single-sex classroom where children not only internalize the line, but see it actually existing giving difference in gender a virtually insurmountable barrier segmenting children into one or the other, and cutting them off from opportunities not existing within their rigidly defined gender category. I have suggested above that sex is a permanent biological reality, where gender exists in relation to the socialization that occurs throughout life beginning the moment the child is deemed male or female. Gender also exists along a continuum that is not given a space in single-sex classrooms. The binary that is reinforced is the existing gender hierarchy of power structures throughout the United States. In order to truly create an equality for our school children it is important to transcend this binary in order to be subversive to the

¹⁰⁶ Barrie Thorne, *Gender Play*, 35.

over all system of inequality.¹⁰⁷ By separating school children they receive the message immediately that they are different in a divisive way from the opposite sex. Although at the present moment, their classroom participation may grow, or their interest in math or reading may increase, it in no real way makes it easier for these girls at the later stages in life. By engaging the children in consistent binaries (the girl class, or the boy class) both boys and girls learn that they are different mentally. Michael Katz verbalized this problem as “this language of difference is both philosophic and practical. We assume that verbal distinctions reflect natural of inherent qualities of people...for convenience, power, or judgment...Invidious distinctions produce injustice.”¹⁰⁸ Difference is one step toward a hierarchy.

Through a rhetoric of gender differences women become to see themselves as biologically determined to hear better, be more receptive to group work, etc and will begin to see themselves less as willful individuals. Although single-sex educators maintain that this is not true, the evidence is not available in either direction. A child who is consistently reminded of their sex and in relation to a sex who is separate from them (in the classroom), that difference will build in the unconscious. The unconscious will create an attachment to their “subjection” or place in the hierarchy of man and women.¹⁰⁹ In United States society, all is not equal—women still get paid \$.78 to \$1 of a man’s earnings, and make up the majority of the people below the

¹⁰⁷ Judith Butler. “Variations on Sex and Gender: Beauvoir, Wittig, Foucault.” *The Judith Butler Reader*, ed. Sara Salih, 22.

¹⁰⁸ Michael B. Katz. *The Undeserving Poor: From the War on Poverty to the War on Welfare* (New York: Pantheon Books, 1989), 5-6.

¹⁰⁹ Judith Butler. *The Psychic Life of Power* (Stanford, CA: Stanford University Press, 1997), 87.

poverty line.¹¹⁰ If we are to remedy these conditions through education, and the solution to the gender gap in math and science (traditionally more well paid professions), then children of both sexes need tools to make that change. By creating a defined difference beginning in pre-adolescence those children are getting the message, that all is not equal, and although both boys and girls are humans, they do not receive the same treatment. Also, a rhetoric or actual separation involving only the dichotomy of gender “exaggerates gender difference and neglects within-gender variation” as mentioned above, but also neglects sources of commonality like ethnicity, social class, heritage, etc which can build ties, relationships, and provide learning experiences not available in single-sex classrooms.¹¹¹

Although it is important to ensure learning in the present for success in the future, it is also equally important to prepare children for life. The NASSPE has many studies that suggest standardized scores have improved once single-sex classrooms have been implemented and children report feeling “comfortable, and safe” in their single-sex environments, but we must ask is this the only thing that is important to us?¹¹² Or is it equally important that children learn the importance of equality, working and interacting with children of all genders, races, etc., and the harm of removing the potential for self-growth through biological determinism? Although children do actively participate in their own socialization, many times they take their cue from adults. Adults can open and encourage “opportunities for boys

¹¹⁰ United States Census Board website: www.census.gov/hhes/www/income/incomestats.html. Accessed 11/3/06.

¹¹¹ Barrie Thorne, *Gender Play*, 96.

¹¹² NASSPE website: www.singlesexschools.org. Accessed 11/2/06

and girls...to get to know one another as individuals and friends” to encourage understanding and sense of collective humanity.¹¹³ It is important to consider whether or not single-sex classrooms are capable of this encouragement and even whether co-educational classrooms without curricula and pedagogical change are capable of fostering this collective humanity. It is also important to reflect on the collective goals of the public school system and see that although people may want change on behalf of their particular group “the public school system of the United States cannot be expected to, and should not, contribute to the fragmentation of the society it is trying to unite,” through dividing classrooms by any defined category such as race, religion and gender.¹¹⁴

¹¹³Barrie Thorne, *Gender Play*, 159.

¹¹⁴ Hochschild and Scovronick, *The American Dream and the Public Schools*, 190.

"Separate but Equal": Legal Issues

With the attempt to make our country more equal, and to break down barriers to access to "life, liberty and pursuit of happiness" you may be asking if single-sex classrooms are really legal in public schools. It seemed odd to me, and many people have pointed out, that in a society where it is almost universally looked down upon to separate more complex categories such as race, religion, and class, why gender is an acceptable category to draw lines across. Currently there has not been any case of major consequence on this particular matter of single-sex classrooms in a co-educational setting where it is affirmed courts that classes are of substantially equal quality. Cases have been tried in the past, however, that will provide the guidelines for courts in deciding the matter at hand. Many cases of gender segregation are immediately under scrutiny due to the Equal Protection Clause, "the test requires the government to show that gender classification serves important governmental objectives and that the discriminatory means employed are substantially related to the achievement of those objectives."¹¹⁵ In one particular landmark case, *Vorchheimer v. School District*, Susan Vorchheimer sued the Philadelphia School District because she was denied admission to an all-boys advanced public school. The court ruled against her, due to the fact there was an all-girls school of similar quality in the same district. This court decision, however, may play a role in upcoming decisions, because of the criticism laid upon the court afterward for failing to investigate the equality of the two schools, which were later found to have unequal facilities in some

¹¹⁵"Inner-City Single-Sex Schools: Educational Reform or Invidious Discrimination?" *The Harvard Law Review* 105, no. 7 (May 1992): 1741-1760.

subjects that the district denied access to by students of the other gender.¹¹⁶ The above decisions seem applicable to this situation, and may play a role in future cases as many people are eager to try the legality of this project, as well as the legality of the bill that was just recently signed by President Bush on October 24th. It is a divisive issue, certainly, but without any direct cases to refer to, I will attempt in this section to provide possible sides to possible future cases on this matter.

Brown v. the Board of Education and Title IX

Recently on October 24th of this year, President G.W. Bush signed into law new rules that “will allow school districts to create single-sex schools and classes as long as enrollment is voluntary.”¹¹⁷ This ruling which provides federal money and support for public schools across the country, both urban and rural, will most likely precede a proliferation of these schools throughout the country. These new federal rules have also been called the first major ruling in public education since the 1972 Anti-Discrimination laws which included Title IX.

The goal of these new rules (which I will discuss in the following section in more detail) is to bring Title IX of the 1972 Education Amendment Acts into conformity with a section of the No Child Left Behind act “that called on the department to promote single-sex schools.”¹¹⁸ It is difficult to see who is in the right in this case, but it is easy to see the discrepancy that will no doubt be battled in courts. Civil rights began many years earlier, but with *Brown v the Board of Education*, the

¹¹⁶ *Vorchheimer v School District*, 532 F.2d 880,881 (3rd Cir 1976), 430 U.S. 703 (1977).

¹¹⁷ Diana Jean Schemo, “Change in Federal Rules Backs Single-Sex Public Education,” *The New York Times* (October 25, 2006).

¹¹⁸ *Ibid*.

country began to repeal some of the previous history of discrimination across racial lines. “With all deliberate speed” the public schools throughout the country were required to not discriminate on the basis of race or religion. Although this court case is a very important victory which marks the beginning of an acknowledgement that as a democracy it is inconsistent and unconstitutional to bar citizens from public institutions, it was not enough change. In the wake of the 1960s, and the Civil Rights Bill, women demanded change and equal access as well. The Civil Rights Act as well as the Education Amendment Acts of 1972 each contains a clause that allows women to have access to all public institutions and ensures that they cannot be discriminated against on the basis of sex. The addition of gender to the Civil Rights Act was a result of documented gender biases by early 1970s feminist researchers. They discovered a long list of abuses (interestingly similar to those that still occur today) and found that schools engaged in “institutional sexism” which was “often more difficult to attack than obvious and deliberate bias.”¹¹⁹ The bar was then set for a mantra of “separate is never equal” approach to public education.

If separate is not equal, then how can single-sex schools even be allowed to exist in post-Title IX America? The answer lies in the gray area, and may some day be decided by the courts. Title IX states “No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal assistance.”¹²⁰ The argument to be made that allows single-sex education in public

¹¹⁹David Tyack, *Seeking Common Ground*, 93.

¹²⁰ Title IX, Education Amendment Acts of 1972, Title 20 U.S.C., Section 1681. 92nd Congress.

schools (institutions which receive Federal assistance) is that the programs are voluntary. Each school that begins a single-sex classroom program must offer students the traditional co-educational classes as well, and single-sex schools must be set in a place where students have equal access to co-educational schools as well. Again I will mention, however, it is less of a choice than proponents, parents or children would like to think.

The argument that separate but not equal could easily be made in the event of a court ruling in single-sex public education, as well. This argument is even a little more gray than the violation of Title IX above. *Brown v. the Board of Education* is a precedent and not a law to be violated, however, in the court case the justices ruled that separate schools constituted a violation of the Amendment 14 of the Constitution “which guarantees all citizens equal protection under the laws.”¹²¹ Separate is inherently unequal because unequal treatment in schools led to an unequal protection by the government which funded those schools. Organizations such as NOW and the ACLU insist that the idea behind separate schools will inherently lead to an unequal educational opportunity for boys or girls. Voluntary single-sex public schools do not constitute a forced situation where girls are unable to escape the unequal settings. A Harvard Law Review article which addressed the issue of single-sex public schools in urban settings stated that “reform efforts must concern themselves with the educational needs of boys and girls alike” but, suggest that school systems should be

¹²¹ Brown v the Board of Education, website: www.brownvboard.org . Accessed 11/3/06.

allowed to establish single-sex schools to “rectify students’ low achievement.”¹²² This argument could be applied to the gender gap in math and science as well. It must not be ignored, however, that throughout America’s history, separate classes have always yielded unequal results and pandering to sex, racial or religious stereotypes. It is difficult to back down and accept that this attempt will be any different. Also, it must be noted at this point, a lag always occurs between when a problem in the educational setting first occurs and when that problem is reported or rectified. Under the grandest attempts to make girls and boys’ classes equal, there may come a time when an inequality is occurring and the child and parent does not realize or take action to be removed and placed in a co-educational setting. Are we prepared to allow loss of educational time on our children under the chance that the classes are truly equal based on inconclusive evidence and a belief in unchangeable biological natures?

NOW, the ACLU, the AAUW and other women’s groups have taken on the challenge of single-sex public classrooms. Earlier in the 1990s, NOW and the ACLU banded together to pass an injunction against schools in Detroit that were using single-sex classrooms to attempt to solve the problems of their urban school district that was in grave danger of collapse. These particular schools, however, were not only separating children by sex within a larger co-educational context, but were creating schools only open to black young men and centered around an Afrocentric curriculum. The combination of a lopsided curriculum centered only on the young

¹²² “Inner-City Single-Sex Schools: Educational Reform or Invidious Discrimination?” *The Harvard Law Review* 105, no. 7 (May 1992): 1741-1760.

men in the community even though the young men were determined to be achieving the least. The “boys only” remedy coupled with the race element provided the basis for this particular injunction that may not apply to single-sex schooling where options are open to both sexes and race is not a classification devise.¹²³

In an article, Leonard Sax dismissed the attempts of these groups as a cover for their opposition to school vouchers and school choice.¹²⁴ It may be that this is the case for some of these women, but they have not addressed that issue and have stated repeatedly that they are concerned with separate education damaging girls in school. NOW cites the Department of Education’s admittance of inconclusive results on the improvement of learning in single-sex classes as inconsistent with their decision to increase funding for single-sex public education options. The admittance of inconclusive results may become an issue as the lack of solid, consistent and repeatable studies may not be found to meet the previous precedent of using discrimination only if the discriminatory measures are “substantially related to the achievement” of the objective of better education for all students.¹²⁵ This lack of evidence may be determined to not meet the judicial standard of substantial currently required to justify the use of separating children into groups based on race, religion, and sex. The article posted on NOW’s website also refers to the progress made since Title IX for the advancement of women and wishes to continue to encourage progress in the same direction; a valid point when considering the evidence of slow, but

¹²³ Ibid.

¹²⁴ Leonard Sax, “The Odd-Couple,” *Women’s Quarterly* (Summer, 2002).

¹²⁵ “Inner-City Single-Sex Schools: Educational Reform or Invidious Discrimination?” *The Harvard Law Review* 105, no. 7 (May 1992): 1741-1760.

increasing access to more pay and higher degrees for women since 1972. The organization also likens segregating children in school to “segregation in the workplace” and believes it will lead to a lifetime of sex stereotyping by denying children the opportunity to interact with their peers as they would in a co-educational environment. Separate has always meant not equal for girls in the past, and there is inconclusive evidence to suggest it will not mean the same in the future.¹²⁶ The ACLU and the AAUW seem to also follow a similar train of thought, and this may constitute potential tactic for future litigation against single-sex schools.

The Hutchison Amendment and No Child Left Behind

The pro-single-sex education community also has some important legislation on its side. Each piece seems in conflict with either the *Brown* ruling, and Title IX, or itself.

The Hutchison Amendment came into being at the same time No Child Left Behind was taking off in Congress. Republican Congresswoman Kay Bailey Hutchison, with the support of Senator Hillary Clinton, passed an Amendment in congress to the 2001 Education Bill (later titled No Child Left Behind) allowing funding up to \$450 million per year to single-sex public education effectively making single-sex separation legal, in conflict with Title IX. It also strengthened the “Women’s Educational Equity” section of No Child Left behind, which seems also in conflict with the Hutchinson Amendment, through its goal “to enable educational agencies to meet the requirements of Title IX...and promote educational equity for

¹²⁶Lisa Bennett, “NOW Opposes Single-Sex Public Education as ‘Separate and Unequal’,” NOW website: <http://www.now.org/press/10-06/10-24.html>. Accessed 11/3/06.

girls and women who experience multiple forms of discrimination.”¹²⁷ In her speech to Congress at the passage of the Amendment, which works under Title VI, the creativity title in the No Child Left Behind Act, Hutchison stated that “we want public schools to be able to...best fit the needs of their students” and “most of the time co-educational classes in schools are going to be the answer.”¹²⁸ Although this amendment and its larger bill No Child Left Behind will undoubtedly serve as the go-ahead for all schools across the nation to move toward some single-sex schooling, the intended application of this amendment is admittedly for schools in dire circumstances, namely urban schools with drastically unequal educational opportunities. The simple legality of an issue and the best way to use the funds are two different issues. In conjunction with the inconclusive evidence as to the educational enrichment of children in single-sex environments, it must be asked whether the appropriate course of action is to allow all schools to be eligible for funding for single-sex schools if it takes from funding for schools that may be better served with the educational funds for a single-sex option.

The new Federal Rules signed 24 October of this year are designed to bring the Hutchison Amendment of the No Child Left Behind Act into conformity with Title IX. The current Education Secretary, Margaret Spellings described these new rules as “a greater effort to expand educational options so that ...every child should

¹²⁷Title V, Part D, Subpart 21, *No Child Left Behind: A Desktop Reference*, 107th U.S. Congress, 2001.

¹²⁸Kay Bailey Hutchison, “Amendment #540 to S.1, The Better Education for Students and Teachers Act,” Senate Floor Speech (June 7, 2001): Page S5943 of the Congressional Record.

receive a high quality education.”¹²⁹ Spellings went on to say that benefits can be reached through single-sex schooling without “watering down the protections of Title IX.”¹³⁰ The rest of the department of Education seemed less convinced when their office of civil rights acknowledged that the evidence was inconclusive in their view. They did admit that some findings showed improved learning in some schools in some places, but this is hardly a whole-hearted endorsement.

It was a bold move for the Education Department to strongly support such a drastic change to the face of education in America without strong evidence for its ability to contribute significantly to a large number of children’s education. It will, however, be interesting in following months and years to see how public education will change across the country, and how the discrepancies described above will be remedied in the courts.

¹²⁹ Diana Jean Schemo, “Change in Federal Rules Backs Single-Sex Public Education,” *The New York Times* (October 25, 2006).

¹³⁰ *Ibid.*

In Conclusion

Regardless of the legality of creating single-sex classrooms within co-educational public schools, it is certain that is more than a trend. With the endorsement of the Secretary of Education, and the signature of the President this past October to allocate \$450 million to single-sex classrooms throughout the country, it is without doubt that these classes will grow in great numbers as schools search for remedies to educational problems. The AAUW study in 1992 brought to the forefront the problems encountered by girls in public schools and the inequality encountered as they struggled to gain ground in the years after the Education Amendment Acts of 1972. Pervasive stereotyping by parents, teachers and peers socialized girls to feel less confident in their abilities, victimized by their peers, and the need to fill traditional female roles despite an outward acceptance of girls who entered previously male fields. All these, and many other complex factors contributed to the achievement gap which left girls behind boys in math and science.

Advocates of single-sex classrooms in public schools such as Dr. Leonard Sax and his National Association of Single-Sex Public Education attempt to make the case for a defined biological difference between girls and boys which is innate and unchangeable. Single-sex advocates feel sex and gender are the same and all related to brain function. Because of this fact, girls and boys should be separated in order for teachers to best serve each gender by catering to their natural learning inclinations. They have put forward numerous studies touting the worth of single-sex education and its ability to produce higher achievers, better behaved students, and less gender-

bound people. All of these studies, however, have been found to be inconclusive for a number of factors, and are clouded with variables. The stereotype threat, self-efficacy, gender identification, teacher bias, parent bias, selectivity within these classes, and class size are but a few of the variables which make it difficult to determine if there is a difference in performance in these classrooms and what exactly that difference may be. Breaking down gender barriers is also a problematic situation within this study as well. Single-sex advocates state that they are the ones breaking down barriers, but by consistently engaging in a physical divide of boys and girls on a daily basis, they are making students constantly aware of the differences between boys and girls and not allowing them to interact in a prolonged and meaningful way prohibits a bridging of a gap beyond gender. All of these flaws, as well as providing no spaces for children who do not fit neatly into Dr. Sax's stereotypical view of how girls or boys act, pushes children apart, not together.

It is difficult to say what the future may hold, but it is certain to hold a proliferation of single-sex classrooms in public schools. Is this what we really want for our children and our collective goals of education in America? I would say not. In looking at the inconclusive evidence, and divisiveness of the program I find it hard to believe that our children will use this particular tool to continue to make the progress that has been made for girls since 1972. Although slow, the last thirty years has seen more young women enter college, graduate, and earn higher degrees in math and science. Title IX does seem to be achieving its goal. I say it will turn back this progress to return to segregation. As a country we have made a statement that it is

unacceptable to separate children by skin color, religion, or beliefs, following this logic it cannot be acceptable to separate children by gender. Today's co-educational classes need change in order to remedy sexist practices and I would suggest that using the \$450 Million to address stereotyping in text books, and among teachers would continue the progress of Title IX and the belief in inclusion within the educational system. Looking into the past we learned that separate is never equal, but by dividing our future citizens, we are sending the message that a person's sex matters and will determine their personality beyond their control. Once we say conclusively that it is appropriate to separate based on biological difference, we are setting up a doomed system which reinforces power of one group over another. Institutionally defined difference leads to hierarchy.

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Vita

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